K^0_S production in Pb+Pb collisions at CERN SPS

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Neutral kaons were reconstructed in NA49 Time Projection Chambers (TPC) using a method described in [1], via their V0 decay topology. A sample of 20000 Pb+Pb events at 158 GeV/c was analyzed and 15000 simulated events were used for efficiency and background estimations. The interaction cross-section is 5 % of σ^{tot}_{inel} which corresponds to b $_{max}$ = 3 fm. Results were obtained in the rapidity region $2.0 < y < 2.8$ and $p_T > 0.4$ GeV/c.

The resulting transverse mass distribution is shown in Fig. 1. An exponential fit ($1/m_T dN/dm_T = e^{-m_T/T}$) gives an inverse slope parameter (T) of 220 ± 15 MeV.

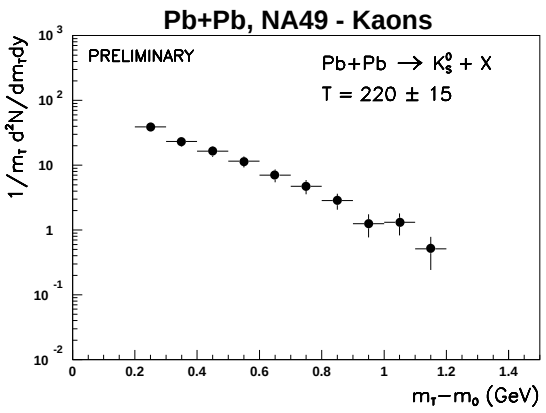

Figure 1: Transverse mass distributions of K ^0_S in the rapidity region $2.2 < y < 2.6$.

By integrating over all p_T values one obtains the rapidity density (dN/dy) which is shown in Fig. 2. The filled symbols are the measured data whereas the open ones are the same values but reflected around mid-rapidity ($y^{Pb+Pb}_{mid} = 2.92$). This is because Pb+Pb is a symmetric system and assuming the trigger biases are negligible. The solid line is the fitted S+S distribution scaled with the ratio of number of participants in the two systems (390/58 = 6.7) which is also the ratio of produced negative hadrons (mostly pions). The two distributions are compatible within errors. This leads to the conclusion that the K $^0_S/\pi$ ratio is about the same in S+S and Pb+Pb collisions [2]. This ratio in S+S was found to be twice as large than in nucleon–nucleon collisions at the same energy [3]. It is therefore intriguing that in a much larger system, like Pb+Pb, there is no further enhancement of this ratio.

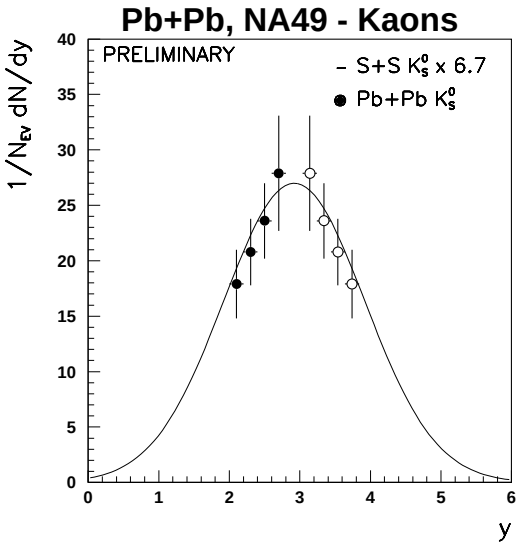

Figure 2: Rapidity distribution of K ^0_S in Pb+Pb collisions (symbols). See text for an explanation of the symbols.

References

[1] S. Margetis, Elsewhere in this report

[2] S. Margetis, Heavy Ion Phys. 4 (96) 63

[3] T. Alber et al, NA35 Collaboration, Z.Phys.C 64(94)195